Measured Variable Independent and Dependent Variables Controlled Variables and Parameters Extraneous Variables Engineering Example

Lecture Module - Introduction

ME3023 - Measurements in Mechanical Systems

Mechanical Engineering
Tennessee Technological University

Topic 2 - Types of Variables

Topic 2 - Types of Variables

- Measured Variable
- Independent and Dependent Variables
- Controlled Variables and Parameters
- Extraneous Variables
- Engineering Example

Measured Variable

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Measured Variable

"A measurement is an act of assigning a specific value to a physical variable. That physical variable is the measured variable."

Independent and Dependent Variables

"If a change in one variable will not affect	t the value of some other
variable, the two are considered independ	ent of each other. A
variable that can be changed independent	tly of other variables is
known as an	A variable
that is affected by changes in one or more	
as a	Normally, the
variable that we measure depends on the control the process."	value of the variables that

Controlled Variables and Parameters

"A variable is	if it can be held at a constant		
value or at some prescribed condition during a measurement			
complete control of a v	variable is not usually possible. We use the		
adjective	to refer to a variable that can be held		
as prescribed, at least in a nominal sense			
we define a	as a functional grouping of		
variables. For example, a moment of inertia or a Reynolds			
numberA	that has an effect on the behavior		
of the measured variable is called a control parameter"			

Measured Variables
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Engineering Example

Extraneous Variables

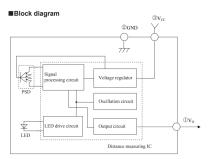
"Variables that are not or cannot be	during
measurement but that affect the value of the	variable measured are
called	Their influence can
confuse the clear relation between cause and e	effect in a
measurementThe effects due to	
can take the form of signals	s superimposed onto
the measured signal with such forms as noise	and drift."

Engineering Example

SHARP I.R. Ranger - Distance Sensor



Image, More Info: Wikipedia



Image, More Info: Wikipedia

Engineering Example

Consider the IR distance ranger, name at least one physical variable for each of the following categories.

- Measured Variable
- Independent Variable
- Dependent Variables
- Controlled Variables
- Extraneous Variables